

# **Turkey Creek Sediment Trap Project**

**Noble County, Indiana**

**April 2008**

Prepared for:  
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and the

**Lake and River Enhancement Program**  
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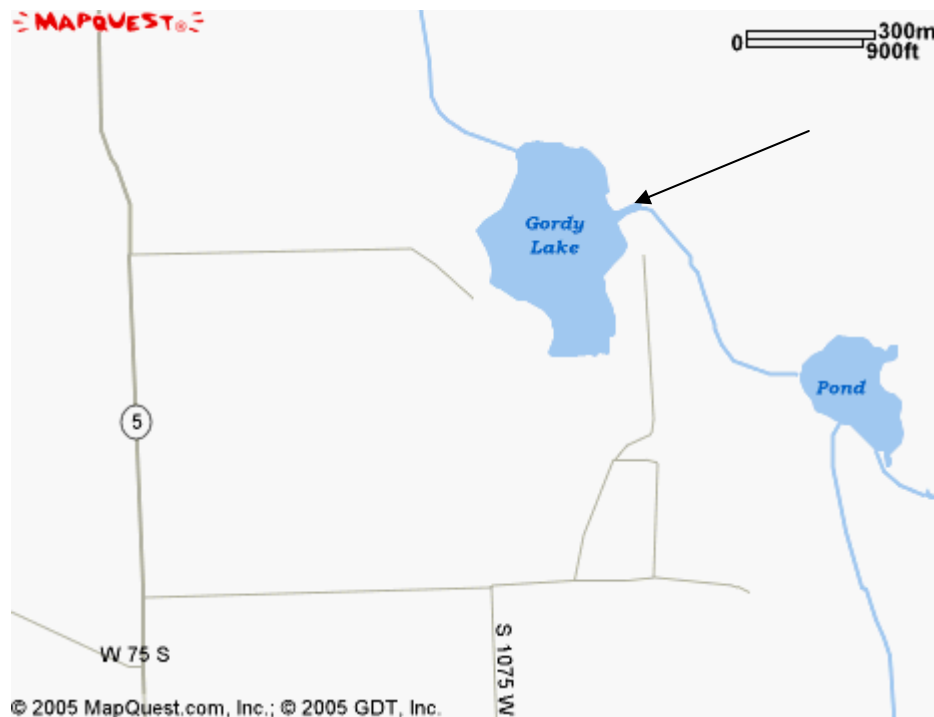
# TURKEY CREEK SEDIMENT TRAP PROJECT FINAL REPORT NOBLE COUNTY, INDIANA

## 1.0 PROJECT DESCRIPTION AND PURPOSE

The Turkey Creek Sediment Trap project is located at the mouth of the Creek as it flows into Gordy Lake in Noble County, Indiana (Figure 1 and 2). Gordy Lake is one of several lakes in a chain of lakes on Turkey Creek, the main waterway feeding Lake Wawasee. The purpose of this project was to reconstruct a previously existing sediment trap that had filled in with sediment from the Turkey Creek watershed. The purpose of the sediment trap is to reduce the delivery of sediment and associated nutrients to Gordy Lake and downstream.



Figure 1. Gordy Lake location map Noble County, Indiana (Delorme map).



**Figure 2. Location of Project on Turkey Creek adjacent to Gordy Lake.**

## 2.0 STATEMENT OF THE PROBLEM

According to the Lake Wawasee Watershed Management Plan participants, Gordy Lake has reportedly received heavy loads of sediment from Turkey Creek for many years. Turkey Creek drains approximately 6,664 acres into Gordy Lake with approximately 50 percent of that area in agriculture. Water samples collected during the watershed management planning process found that approximately 1 kilogram per day of sediment was in suspension during base flows within the upper end of Turkey Creek and upwards of 14 kilograms per day were in suspension during storm flows. These values equate to 2.8 tons per year of sediment at base flow and 5.6 tons per year during storm flow. The average sediment load from Turkey Creek into Gordy Lake is likely around 3-4 tons per year. That sediment ends up in one of the five lakes along Turkey Creek or in Lake Wawasee.

## 3.0 DESIGN RATIONALE

Sediment traps function by reducing the velocity of flowing water, which allows particles to settle out of suspension. Generally, the wider the sediment trap is constructed within the flowing waterway, the better it will perform in removing sediment. Fine particles such as clay, are much harder to remove from suspension than silt or sand and require a much larger area to remove than what was had available for this project. The design of the sediment trap was not engineered. It was designed to utilize the entire disturbed

area from previous excavation activities at this location. The sediment trap will be large enough to capture any bed load, sand particles in suspension, and a majority of the silt and organic matter coming down Turkey Creek. The sediment trap is not likely large enough to facilitate the settling of clay particles, although no studies have reported clay particles in suspension at this location.

The methods of construction considered included hydraulic dredging and mechanical dredging. The hydraulic dredging of the site was considered because it would not disturb the adjacent shoreline except for the sediment dewatering basin. Hydraulic dredging was eliminated from consideration due to the expense of mobilization and the expense of building a dewatering basin large enough to accommodate the excavated materials and the water (hydraulic dredge spoils typically contain 90 percent water). Mechanical dredging of the site was possible with a long reach excavator (50-foot); it allowed for a reduced dewatering basin size; and mobilization fees were one-fourth that of the hydraulic dredge. The over all project cost associated with mechanical dredging was approximately one-half of the cost of completing the work with a hydraulic dredge.

## **4.0 DESIGN AND CONSTRUCTION SPECIFICS**

### **4.1 Sediment Trap**

The sediment trap was designed to be 120 feet long and 50 feet wide with a depth of 8 feet at low water levels (Appendix A). Approximately 873 cubic yards of sediment were designed to be mechanically excavated from within the sediment trap. The project was designed to place the excavated sediments directly into an adjacent dewatering basin during the excavation process.

The final size of the constructed trap is 120 feet long by 50 feet wide with a maximum depth of 11 feet in the center. The average depth of the sediment trap in the center line was approximately 9.5 feet at water levels observed in spring of 2008. The side slopes of the sediment trap are between 2:1 and 3:1. The bottom of the trap is silt (marl) and sand.

### **4.2 Spoils Area**

The dewatering basin was located approximately 30 feet south of the sediment trap. The basin was constructed with an approximate four-foot depth and extended approximately 100 feet by 80 feet. The dewatering basin was constructed by excavating a small depression and using the excavated materials to form a berm around the depression. There was no return water pipe. Water from the removed sediment was allowed to evaporate or seep into the ground from the basin. The dried sediment was removed by loading it into a truck and moving it to various upland locations on the same parcel. These areas were graded to match adjacent contours and seeded. The dewatering basin site was then leveled to match the existing landscape and seeded. Mulch, including straw and erosion control blankets, was used to protect the seed and reduce the risk of erosion prior to seed establishment. The

seed mix included oats, annual rye, Canada rye, Virginia rye, little bluestem, sand coreopsis, black eyed susan, and other forbs.

#### **4.3 Landowner Agreement**

The project was designed and constructed within property that was owned by the subcontracted excavation firm (Earthwerks). Earthwerk's sole owner is a member and supporter of the WACF and thus no specific owner permission was sought for the project to proceed.

#### **4.4 Permitting**

A permit application was submitted to the Indiana Department of Natural Resources for Construction in a floodway. The permit was obtained in September 2005 (Appendix B). Since the spoils basin was sited on upland and did not have any direct return water to the lake or stream a Clean Water Act, Section 404 permit was deemed not necessary.

#### **4.5 Project Cost**

The project cost below documents the contracted fee to complete the project as design-build through JFNew. JFNew employed a subcontractor (Earthwerks) for the excavation of the sediment trap, construction of the spoils basin, removal of the spoils to an upland location, and preparation of the site for final seeding. JFNew installed the seed and erosion control materials with assistance from Earthwerks. The total cost of the project was \$26,555. JFNew was not made aware of other proposals that may have been received by WACF during the LARE required bid process for this project.

**Table 1. Actual costs associated with project implementation.**

<b>Description of Work Item</b>	<b>Unit of Measure</b>	<b>Total</b>
Design field work, plans, permits, and Project Management	Lump Sum	\$ 9,326
Construction	Lump Sum	\$ 17,050
Final Report	Lump Sum	\$ 1,790
<b>Total</b>		<b>\$ 26,555</b>

### **5.0 CONSTRUCTION SCHEDULE**

The project was proposed to proceed in fall of 2005 with the construction of the dewatering basin. Flooding delayed the start of the project until July 2006 when the dewatering basin and the sediment trap were constructed. Initial seeding and erosion control followed the excavation of the sediment trap within one week of completion in July 2006. The spoils within the dewatering basin were allowed to dry for a long period due to the above average level of precipitation that occurred between July 2006 and the winter of 2007-2008. Removal of the majority of spoils from the dewatering basin occurred between March and April 2008 with final site preparation completed in April. Seeding and mulching of all the disturbed areas occurred within a week after site preparation was completed with the entire construction project completed by April 30, 2008. Photographs of the project site before and after construction are located in Appendix C.



## **6.0 MONITORING AND MAINTENANCE ACTIVITY**

An inspection of the sediment trap should be conducted every two to three years to determine maintenance cleaning needs. This can be determined by measuring the depth of the sediment trap and comparing it to the depths shown in the construction drawings (Appendix A). A graduated PVC pipe should be used to measure the depth of water and any accumulated sediments in the bottom of the pond. After sediment fills more than 1/3 of the depth of the sediment trap, arrangements should be made to have the trap cleaned. The sediment trap may not require maintenance for 10 to 20 years. Material obtained from trap maintenance will be suitable for redistribution on upland fields.

Vegetative development on the area disturbed during construction will take three to five years to be fully established. During the first three years the areas should be mowed annually to reduce herbaceous weeds, shrubs, and trees. Supplemental seeding with annuals is acceptable to increase esthetics during these first few years. During the first season the annual oats and rye crop should be sufficient to cover the ground surface and reduce potential weed competition. If the cover crop of annuals is not established by June of 2008 then the contractor or project engineer shall be notified and new seed and mulch applied to the site.

## **7.0 PROJECT SUMMARY**

Turkey Creek is the largest source of water for Lake Wawasee, draining 10,122 acres and carrying with it up to 10 tons of sediment per year. The sediment reaching Lake Wawasee from Turkey Creek is suspended sediments originating from the watershed. There are five lakes upstream of Lake Wawasee, each acting as a sediment trap and capturing some of the sediment flowing down Turkey Creek. Gordy Lake is situated at the approximate mid point of Turkey Creek between Knapp Lake and Lake Wawasee. Turkey Creek had been widened at its junction with Gordy Lake at some period in the past for Camp activities. This widening created a sediment trap. The trap had been filled in by the watershed sediments in subsequent years. The LARE program provided WACF with a design-build grant to reconstruct the sediment trap. The sediment trap constructed is 120 feet long, 50 feet wide and approximately 10 feet deep. The project was completed in 2008.



**APPENDIX A**

**Turkey Creek Sediment Trap Project**

**DESIGN PLANS**





Corporate Office  
1700 N. West Street, Suite 100  
Westerville, Ohio 43081  
614-885-3400 Fax: 614-885-3440  
www.jfnew.com  
800-368-3400  
317-298-1400  
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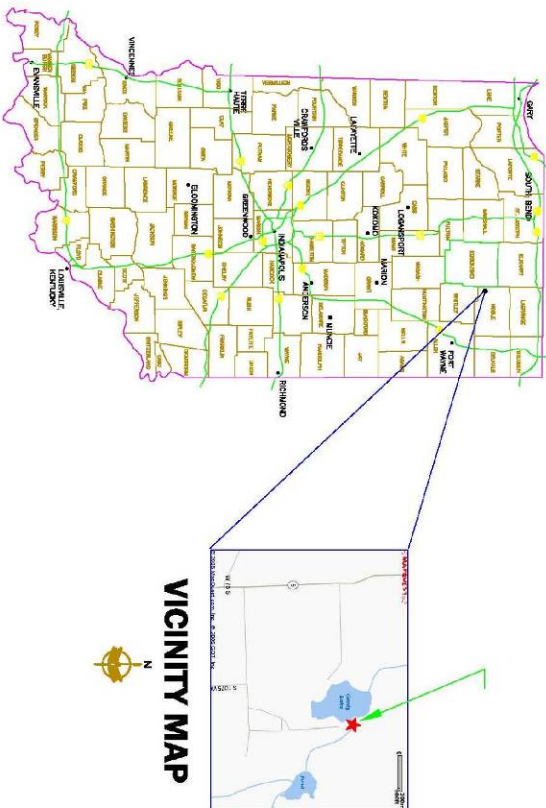
INDEX OF DRAWINGS

SHEET	SHEET DESCRIPTION
1	COVER SHEET - VICINITY MAP
2	PLAN VIEW AND CROSS SECTIONS

WAWASEE AREA  
CONSERVANCY FOUNDATION

NOBLE COUNTY  
SYRACUSE, INDIANA

TURKEY CREEK SEDIMENT TRAP  
APRIL 2005

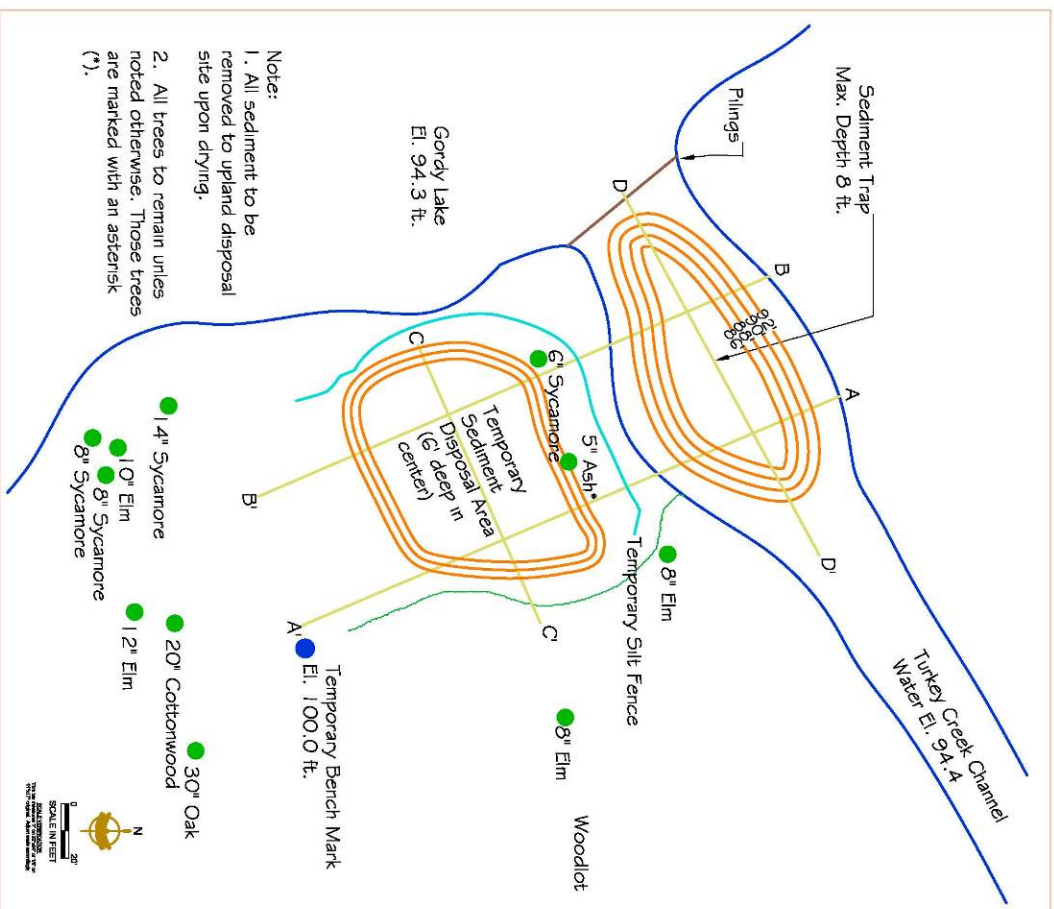


DRAWING NO.  
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OF 1

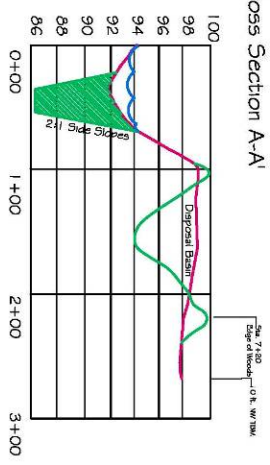
WAWASEE AREA  
CONSERVANCY FOUNDATION  
GORDY LAKE  
SEDIMENT TRAP CONSTRUCTION-TURKEY CREEK  
COVER SHEET - VICINITY MAP



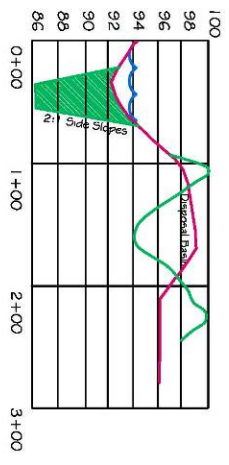


Note:  
1. All sediment to be removed to upland disposal site upon drying.  
2. All trees to remain unless noted otherwise. Those trees are marked with an asterisk (\*).

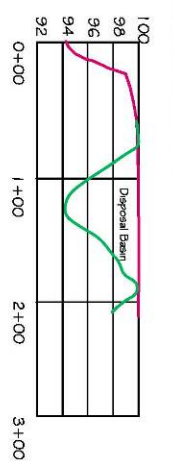
Cross Section A-A'



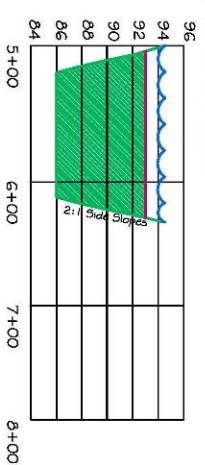
Cross Section B-B'



Cross Section C-C'



Cross Section D-D'



**APPENDIX B**

**Turkey Creek Sediment Trap Project**

**PERMIT**

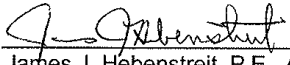




STATE OF INDIANA  
DEPARTMENT OF NATURAL RESOURCES

**CERTIFICATE OF APPROVAL  
PUBLIC FRESHWATER LAKE**

**MAILED SEP 09 2005**

**APPLICATION #** : PL-20192  
**LAKE** : Gordy Lake  
**APPLICANT** : Wawasee Area Conservancy Foundation  
Heather Harwood, ASLA  
PO Box 548  
Syracuse, IN 46567-0548  
**AGENT** : JF New & Associates, Inc  
Joe Exl  
708 Roosevelt Road  
Walkerton, IN 46574-1220  
**AUTHORITY** : IC 14-26-2 with 312 IAC 11  
**DESCRIPTION** : Maintenance dredging will be performed on an existing sediment trap. Approximately 873 cubic yards of sediment will be mechanically excavated from the sediment trap by a long-reach backhoe. The sediment will be placed directly from the sediment trap into a dewatering basin that is to be constructed prior to maintenance dredging. The dewatering basin will be located approximately 20' south of the sediment trap. The dewatering basin will be constructed by excavating a small depression and using the excavated materials to form a berm around the depression. There will be no return water pipe as a part of this project. Water from the removed sediment will be allowed to naturally seep into the ground from the basin. Silt fencing or equivalent will be installed along the north, south, and west side of the dewatering basin. Upon drying, the dewatering basin will then be leveled to match the existing landscape and seeded. Details of the project are contained in information received electronically at the Division of Water on June 28, 2005 and in plans and information received at the Division of Water on August 11, 2005.  
**LOCATION** : Near the inlet of Turkey Creek into Gordy Lake near North Webster, Sparta Township, Noble County  
SE¼, NE¼, NW¼, Section 5, T 33N, R 8E, Ormas Quadrangle  
UTM Coordinates: Downstream 4578646 North, 615063 East  
**APPROVED BY** :   
James J. Hebenstreit, P.E., Assistant Director  
Division of Water  
**APPROVED ON** : September 7, 2005

Attachments: Notice Of Right To Administrative Review  
General Conditions  
Special Conditions  
Service List



**APPENDIX C**

**Turkey Creek Sediment Trap Project**

**PHOTOGRAPHS**





**Mouth of Turkey Creek at Gordy Lake before and after sediment trap construction.**



**Facing East across Turkey Creek at sediment trap area before and after construction**



**Facing east across the mouth of Turkey Creek at Gordy Lake before and after construction**

